



Original Research Article

Preliminary Phytochemical Screening of *Curcuma caesia*

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A B S T R A C T

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Curcuma caesia is commonly known as kali haldi and it belongs to the family Zingiberaceae. This herb is available throughout north-east, central India, Papi Hills of East Godavari, West Godavari and Andhra Pradesh. In the traditional system of medicine, fresh and dried rhizomes of *Curcuma caesia* Roxb are used in treating leucoderma, asthma, tumours, piles, bronchitis, bruises, etc. The aim of this study was to evaluate phytochemical constituent of *Curcuma caesia* Roxb. In our studies it was investigated that alkaloids, phenols, phytosterols, terpenoids, carbohydrates, tannins, glycosides, saponins, quinones, amino acids, oils and flavonoids are present in *Curcuma caesia*. This article brings to light the major active components present in *Curcuma caesia* that may be important from the pharmacological point of view.

Introduction

Curcuma Linn. is a large genus belonging to the family Zingiberaceae. It comprises about 70 species of rhizomatous herbs distributed mostly in Southeast Asia as wild and cultivated plants (Sastri, 1950). Kali haldi (*Curcuma caesia*) is a perennial herb with bluish-black rhizomenative to Northeast and Central India. Black Turmeric is also sparsely found in Papi Hills of East Godavari, West Godavari, and Khammam Districts of Andhra Pradesh. The rhizomes of kali haldi have a high economical importance because of its putative medicinal properties. The rhizomes are used in the treatment of smooth muscle relaxant activity (Arulmozhi *et al.*, 2006), haemorrhoids, leprosy, asthma, cancer, epilepsy, fever,

wound, vomiting, menstrual disorder, anthelmintic, aphrodisiac, inflammation, gonorrhoeal discharges, etc (Sasikumar, 2005).

In Madhya Pradesh, the plant is regarded as very auspicious and is stated that a person who possess it will never experience shortage of cereals and food. The rhizomes of the plant are aromatic in nature. The inner part of the rhizome is bluish-black in colour and emits a characteristic sweet smell, due to presence of essential oil (Pandey and Chowdhary, 2003). Traditionally, the rhizomes of *Curcuma caesia* Roxb. are used in treating leucoderma, asthma, tumours, piles, bronchitis etc. The paste is applied on

bruises, contusions and rheumatic pains in Manipur (Sarangthem and Haokip, 2010). In Arunachal Pradesh, Adi tribes use decoction of fresh rhizome as anti-diarrhoeic. The Khamti tribe of Lohit district applied the paste of fresh rhizome in case of snake and scorpion bite (Kagyung *et al.*, 2010; Tag *et al.*, 2007).

Materials and Methods

Collection of plant material

The plant material used in present study was collected from (Gudala, Allavaram and Amalapuram) Andhra Pradesh. The plant materials were further identified in the Department of Botany, Dr.V.S.Krishna College, Visakhapatnam, India.

Preparation of rhizome extracts

The collected Rhizome was shade dried, powdered and extracted with hexane, chloroform and methanol using soxhlet apparatus for 8 hours. The extracts were filtered and filtrates were concentrated under reduced pressure at 40°C using a rotaflash evaporator and stored at 4°C until use for phytochemical screening.

Screening of phytochemicals

About 20g of the rhizome powder was soaked in 100 ml methanol solvent and incubated for 48 hrs and then filtered using Whattmann No.1 filter paper and methanol extract was obtained.

Phytochemical analysis was carried out using methanol plant extract using standard methods (Amarsingham *et al.*, 1964; Harborne, 1973; Raaman, 2006; Karhikeyan *et al.*, 2009). The detailed and systematic pharmacognostic and phytochemical evaluations of *Curcuma caesia* gives valuable information in order to produce

standardized finished herbal products.

Identification tests for phytochemical constituents

The tests were performed to find out the presence of active chemical constituents such as alkaloids, terpenes, flavones, flavonoids, steroids, reducing sugars, proteins, amino acids, carbohydrates, tannins, anthraquinones, glycosides, cardiac glycosides by the following procedure. Phytochemical analysis was carried out for all the extracts using standard methods.

Alkaloids

Extracts were dissolved individually in diluted hydrochloric acid. The resulting acidic solution was tested for alkaloids by adding Mayer's reagent, Wagner's reagent, Dragendroff reagent and Hager's reagent. The formation of a faint turbidity or precipitation on the addition of the above reagents indicates the presence of alkaloids.

Flavanoid

2-3 ml of plant extract was dissolved in 50% of methanol and warmed then add a piece of magnesium ribbon and 1ml of concentrated HCl. Red or yellow coloration of the solution indicates the presence of flavonoids.

Tannins

A few ml of potassium dichromate added to the plant extract, formation of precipitate showed the presence of tannins and phenolics.

Saponins

Frothing test: 0.5 ml of plant filtrate was added to 5 ml of distilled water and examined for frothing persistence.

Cardiac glycosides

To the plant extract few ml of glacial acetic acid, ferric chloride and concentrated H₂SO₄ were added. Green color indicates the presence of cardiac glycosides

Phenols

Add a few drops of 10% aqueous FeCl₃ to the plant extract, appearance of blue or green color indicates presence of phenols.

Carbohydrates

a) **Molisch's test:** To few ml of plant extract 1ml of alpha-Naphthol solution and conc.H₂SO₄ was added along the walls of the test tube. Purple to reddish violet colour at the junction of the two layers indicates the presence of carbohydrates.

b) **Fehling's test:** Equal volumes of Fehling's-A & B were added. On heating the formation of brick red precipitate indicates the presence of carbohydrates.

c) **Benedict's test:** To 5 ml of Benedict's reagent few ml of plant extract was added and boiled for 2min, cooled. The formation of red precipitate indicates the presence of carbohydrates.

Amino acids: Two drops of Ninhydrin Reagent was added to the plant extract. Purple colour indicates the presence of amino acids.

Quinones: To 1ml of extract 1ml of conc.H₂SO₄ were added, formation of red color indicates the presence of quinones.

Results and Discussion

This study has revealed the presence of phytochemicals considered as active medicinal chemical constituents. Important

medicinal phytochemicals such as terpenoids, reducing sugar, flavonoids, alkaloids and phlobatannins were present in the samples. Epidemiologic studies recommend that coronary heart disease is opposed by dietary flavonoids.

Tannins have amazing stringent properties. They are known to hasten the healing of wounds and inflamed mucous membranes. Flavonoids are also present in all six selected medicinal plants as a potent water-soluble antioxidant and free radical scavenger, which prevent oxidative cell damage and also have strong anticancer activity (Rio *et al.*, 1997; Salah *et al.*, 1995). It also helps in managing diabetes induced oxidative stress. Terpenoids have been found to be useful in the prevention and therapy of several diseases, including cancer. Terpenoids are also known to possess antimicrobial, antifungal, antiparasitic, antiviral, anti-allergenic, antispasmodic, antihyperglycemic, anti-inflammatory and immunomodulatory properties (Rabi and Bishayee, 2009; Wagner and Elmadfa, 2003).

Numerous studies have confirmed that saponins possess the unique property of precipitating and coagulating red blood cells and steroids are responsible for cholesterol-reducing properties (Okwu, 2004; Sodipo *et al.*, 2000). Steroids also help in regulating the immune response (Shah *et al.*, 2009).

Alkaloids represent a class which affects the central nervous system, reduces appetite and behaves as diuretic (United States Department of Agriculture, 2010). In our studies it was investigated that alkaloids, phytosterols, terpenoids, carbohydrates, tannins, anthraquinones, glycosides, quinones, oils, flavonoids, amino acids and saponins are present in *Curcuma caesia*.

Table.1 Phytochemical constituents present in different extracts of *Curcuma caesia*

S.No	Name of the Phytochemicals	Extracts of <i>Curcuma caesia</i>		
		Hexane Extract	Chloroform Extract	Methanol Extract
1	Phenols	+	+	+
2	Phytosterols	+	+	+
3	Terpenoids	+	+	+
4	Glycosides	+	+	+
5	Saponins	+	+	+
6	Flavonoids	+	+	+
7	Tannins	-	+	+
8	Carbohydrates	+	+	+
9	Alkaloids	+	+	+
10	Amino acids	+	+	+
11	Oils	+	+	+
12	Quinones	+	+	+

The selection of crude plant extracts for screening programs has the potential of being more successful in initial steps than the screening of pure compounds isolated from natural products. The plant extract are the source of the secondary metabolites i.e., alkaloids, flavonoids, terpenoids, tannins etc. The phytochemical analysis of the *Curcuma caesia* is important and has commercial interest in both research institutes and pharmaceuticals companies for the manufacturing of the new drugs for treatment of various diseases. *Curcuma caesia* has medicinal value the presence of these major constituents (Paliwal *et al.*, 2012). Thus we hope that the important phytochemical properties identified by our study in the local plant of Gudala, Allavaram, Amalapuram will be helpful in the coping different diseases of this particular region.

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